AMENDMENTS TO THE CLAIMS

1. (Withdrawn) A method for detecting pathogens attached to specific antibodies, comprising:

providing a fluidic channel with at least one pair of spaced electrodes,

providing an AC or DC power source to produce an electric field across the at least one pair of spaced electrodes,

depositing antibodies on the spaced electrodes,

measuring the impedance between the spaced electrodes,

directing a sample fluid containing pathogen past the spaced electrodes,

measuring the impedance between the spaced electrodes, and

determining the presence of pathogen attached to the antibodies by comparing the impedance measurements.

2. (Withdrawn) The method of Claim 1, additionally including directing antibody-coated beads past the space electrodes for attachment to the pathogen, and determining the attachment of the antibody-coated beads by measuring the impedance between the spaced electrode and comparing with an impedance measure prior to directing the antibody-coated beads past the spaced electrodes.

3. (Withdrawn) The method of Claim 1, wherein the at least one pair of electrodes comprises a plurality of adjacent spaced pairs of electrodes.

4. (Withdrawn) The method of Claim 1, wherein the at least one pair of spaced electrodes is formed on surfaces of the fluidic channel.

5. (Withdrawn) The method of Claim 4, wherein forming the spaced electrodes on the surfaces of the fluidic channel is carried out by depositing an interdigitated electrode on the surfaces whereby adjacent fingers of the interdigitated electrode form at least one pair of spaced electrodes.

6. (Withdrawn) The method of Claim 5, additionally including forming the interdigitated electrode to produce a plurality of sets of adjacent pairs of electrodes.

7. (Withdrawn) The method of Claim 1, additionally including providing an impedance sensor assembly operatively connected to at least one pair of spaced electrodes for measuring the impedance between the spaced electrodes, an including impedance readout means.

8. (Withdrawn) The method of Claim 7, additionally includes providing reference electrodes in insulated and spaced relation to the at least one pair of spaced electrodes, and electrically connecting the impedance sensor assembly to the reference electrodes.

9. (Withdrawn) The method of Claim 7, wherein providing the impedance sensor assembly is carried out by at least amplifiers and mixers to measure the in-phase and out-of-phase impedance.

10. (Previously Presented) An apparatus including means for determining trapping of pathogens carried by a fluid by antibodies deposited in a fluidic channel, comprising:

a fluidic channel having at least one pair of spaced electrodes having surfaces and with a space between said electrodes, said electrodes localized along a length of said fluidic channel, with the electrodes of said at least one pair being located on the same side of said fluidic channel,

antibodies immobilized on said surfaces of said spaced electrodes and immobilized in said space between said electrodes wherein said pathogens carried by said fluid attach to said immobilized antibodies,

beads coated with antibodies located in said space between said electrodes wherein said beads coated with antibodies stick to the pathogens,

means for producing an electric field across said spaced electrodes, and

an impedance sensor for measuring impedance between said spaced electrodes for determining trapping of said pathogens by measuring change in impedance between said pair of spaced electrodes with said beads coated with antibodies amplifying the change in impedance.

11. (Original) The apparatus of Claim 10, additionally including at least one pair of reference electrodes located in spaced relation to said at least one pair of spaced electrodes, an insulator located between said reference electrodes and said pair of spaced electrodes, said reference electrodes being electrically connected to said impedance sensor.

12. (Original) The apparatus of Claim 10, wherein said at least one pair of spaced electrodes is located on a surface of said fluidic channel.

13. (Original) The apparatus of Claim 12, wherein said at least one pair of spaced electrodes comprises a plurality of adjacent pairs of spaced electrodes.

14. (Original) The apparatus of Claim 13, wherein said plurality of adjacent pairs of spaced electrodes are formed by adjacent fingers of an interdigitated electrode located on the surface of said fluidic channel.

15. (Previously Presented) The apparatus of Claim 10, wherein said means for producing an electric field across said spaced electrodes comprises an AC power supply.

16. (Previously Presented) A sensor using impedance measurements to detect the presence of pathogens attached to antibodies wherein said pathogens are carried by a fluid, comprising:

a microfluidic device having at least one microchannel therein,

at least one pair of spaced electrodes located on a surface along a length of said microchannel,

said pair of spaced electrodes having surfaces and being located on the same surface of the microchannel with a space between said electrodes,

antibodies immobilized on said surfaces of said spaced electrodes and immobilized in said space between said electrodes wherein said pathogens carried by said fluid attach to said immobilized antibodies,

beads coated with antibodies located in said space between said electrodes wherein said beads coated with antibodies stick to the pathogens,

an AC or DC power supply for producing an electric field across said spaced electrodes, and

means for measuring impedance between said spaced electrodes to detect the presence of said pathogens by measuring change in impedance between said pair of spaced electrodes with said beads coated with antibodies amplifying the change in impedance.

17. (Previously Presented) The sensor of Claim 16, wherein said spaced electrodes comprise fingers of an interdigitated electrode formed on said surface of said microchannel.

18. (Original) The sensor of Claim 17, wherein said interdigitated electrode includes fingers forming a plurality of adjacent pairs of spaced electrodes.

19. (Original) The sensor of Claim 15, additionally including reference electrodes located in insulated relation to said spaced electrodes and electrically connected to said means for measuring impedance.

20. (Original) The sensor of Claim 16, wherein said means for measuring impedance between said spaced electrodes includes a plurality of signal generators, a current sensor connected to at least one electrode, a plurality of amplifier/mixer assemblies connected in parallel to said current sensor, said signal generators each being connected to one of said amplifier/mixer assemblies, and one of said signal generators being additionally connected to another of said spaced electrodes.

21. (Previously Presented) The sensor of Claim 16, wherein the at least one pair of spaced electrodes is formed within the fluidic channel.

22. (Previously Presented) The apparatus of Claim 16, wherein said spaced electrodes are located in a bottom surface of said fluidic channel.

23. (Previously Presented) The sensor of Claim 16, wherein said spaced electrodes are located in a bottom surface of said at least one microchannel.

24. (Previously Presented) In an apparatus having means for determining trapping of pathogens carried by a fluid by antibodies deposited in a fluidic channel, the improvement comprising:

at least one pair of spaced electrodes having surfaces and with a space between said electrodes, said spaced electrodes located on a same surface and along a length of said fluidic channel,

antibodies immobilized on said surfaces of said spaced electrodes and immobilized in said space between said space electrodes wherein said pathogens carried by said fluid attach to said immobilized antibodies,

beads coated with antibodies located in said space between said electrodes wherein said beads coated with antibodies that stick to the pathogens,

means for producing an electric field across said spaced electrodes, and

an impedance sensor for measuring impedance between said spaced electrodes for determining trapping of said pathogens by measuring change in impedance between said pair of spaced electrodes with said beads coated with antibodies amplifying the change in impedance.

25. (Previously Presented) The improvement of Claim 24, wherein said surface along a length of said microchannel is a bottom surface of said fluidic channel.

26. (Previously Presented) The improvement of Claim 24, additionally including at least another pair of spaced electrodes having an electric field thereacross and provided with antibodies thereon.

27. (Previously Presented) The improvement of Claim 26, wherein said pairs of spaced electrodes constitute adjacent fingers of an interdigitated electrode formed on said surface of said fluid channel.

28. (Previously Presented) The improvement of Claim 27, wherein said interdigitated electrode is at least partially located on a bottom surface of said fluidic channel.